

Claims

1. A biodegradable matrix for inducing cell migration therein, wherein two peptides are covalently linked to the matrix, a first peptide being cleavable by natural proteases and the other comprising a cell-attracting peptide.
2. The matrix of claim 1 wherein the matrix comprises dextran.
3. The matrix of claim 2 wherein the dextran is glycidyl methacrylate dextran.
4. The matrix of claim 2 wherein the dextran has a molecular weight of 40 kDa.
5. The matrix of claim 1 wherein the first peptide comprises at least the sequence CGGLGPAGGLC (SEQ ID NO: 1).
6. The matrix of claim 1 wherein the second peptide comprises at least the sequence RGD.
7. The matrix of claim 6 wherein the RGD sequence further comprises CRGDSP (SEQ ID NO: 2)
8. The matrix of claim 6 wherein the RGD sequence further comprises CRGDSPC (SEQ ID NO: 3)
9. A method of preparing a dextran hydrogel suitable for cellular in-growth, the method comprising
 - a. providing a dextran;
 - b. combining the dextran with a cleavable peptide and a peptide capable of attracting cells to produce a conjugated dextran;
 - c. combining the conjugated dextran with acryloylated dextran;
 - d. adding to the dextran mixture a polymerization initiator; and
 - e. activating the initiator to form a hydrogel.
10. The method of claim 9 wherein the provided dextran is dextran 40.
11. The method of claim 9 wherein the cleavable peptide comprises CGGLGPAGGLC (SEQ ID NO: 1).
12. The method of claim 9 wherein the peptide capable of attracting cells comprises at least RGD.
13. The method of claim 12, wherein the RGD peptide further comprises CRGDSP (SEQ ID NO: 2).
14. The method of claim 12, wherein the RGD peptide further comprises CRGDSPC (SEQ ID NO: 3).

15. The method of claim 9 wherein the conjugated peptide is in higher proportion than the acryloylated dextran.

16. A method of preparing a hydrogel suitable for promoting cellular in-growth, the method comprising

a. providing dextran;

b. combining the dextran with dimethylsulfoxide (DMSO), dimethylaminopyridine (DMAP) and glycol methacrylate (GMA) to form glycidyl methacrylate dextran;

c. combining the glycidyl methacrylate dextran with acryloylated dextran;

d. combining the dextran mixture with a polymerization initiator and with at least two peptides, a first peptide capable of attracting cells and a second peptide being degradable by cellular proteases, in a dilute electrolyte solution; and

e. applying energy to polymerize the mixture, thus producing a hydrogel.

17. The method of claim 16, wherein step b is performed with the sequential addition of DMSO, DMAP and GMA.

18. The method of 16, wherein step b is followed by mixing at room temperature until the solution is completely dissolved.

19. The method of 16, wherein the mixing step is followed by adding hydrochloric acid to neutralize the solution and stop the reaction.

20. The method of 16, wherein step c is followed by dialyzing the acryloylated dextran.

21. The method of claim 16, wherein the content of the conjugated dextran is greater than the content of acryloylated dextran.

22. An implant comprising a dextran hydrogel, wherein two peptides are covalently linked to the dextran, a first peptide being cleavable by natural proteases and the other comprising a cell-attracting peptide.

23. The implant of claim 22, wherein the dextran has a molecular weight of 40 kDa.

24. The matrix of claim 22, wherein the dextran is glycidyl methacrylate dextran.

25. The matrix of claim 22, wherein the first peptide comprises at least the sequence CGGLGPAGGLC (SEQ ID NO: 1).

26. The matrix of claim 22 wherein the second peptide comprises at least the sequence RGD.

27. The matrix of claim 26 wherein the RGD sequence further comprises CRGDSP (SEQ ID NO: 2).
28. The matrix of claim 26 wherein the RGD sequence further comprises CRGDSPC (SEQ ID NO: 3).
29. A dextran matrix for inducing cell migration therein, wherein a peptide is covalently linked to the matrix, the peptide being cleavable by natural proteases.
30. The matrix of claim 29 wherein the cleavable peptide comprises CGGLGPAGGLC (SEQ ID NO: 1), CGGLGPAGGKG (SEQ ID NO: 4), or a combination thereof.
31. The matrix of claim 29 wherein the dextran is glycidyl methacrylated dextran.
32. The matrix of claim 29 wherein the dextran has a molecular weight of 40 dKa.
33. A dextran matrix for inducing cell migration therein, wherein a peptide is covalently linked to the matrix, the peptide comprising a cell-attracting peptide.
34. The matrix of claim 33 wherein the dextran is glycidyl methacrylated dextran.
35. The matrix of claim 33 wherein the dextran has a molecular weight of 40 dKa.
36. The matrix of claim 33 wherein the peptide is CRGDSP (SEQ ID NO: 2), CRGDSPC (SEQ ID NO: 3), or a combination thereof.